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January 7, 2005

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Commissioner for Patents  
PO Box 1450  
Alexandria, VA 22313-1450

**Art Unit 2817**

Re: U.S. Patent No. 6,819,199 B2; Issued: November 16, 2004  
(from Appl. No. 09/892,755; Filed: June 28, 2001)  
For: **Balun Transformer with Means for Reducing a Physical Dimension  
Thereof**  
Inventors: Burns *et al.*  
Our Ref: 1875.0350001

Sir:

Transmitted herewith for appropriate action are the following documents:

1. Fee Transmittal;
2. Request for Certificate of Correction under 37 C.F.R. §§ 1.322 and 1.323;
3. Certificate of Correction (Form PTO/SB/44);
4. Exhibits A & B;
5. PTO-2038 Credit Card Payment Form for \$100.00 to cover the Certificate of Correction Fee (Applicant Error); and
6. ONE (1) return postcard.

It is respectfully requested that the attached postcard be stamped with the date of filing of these documents, and that it be returned to our courier. In the event that extensions of time are necessary to prevent abandonment of this patent application, then such extensions of time are hereby petitioned.

**Certificate**  
**JAN 18 2005**  
**of Correction**

01/10/2005 GWORDF2 00000182 6819199

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100.00 OP

Commissioner for Patents  
January 7, 2005  
Page 2

The U.S. Patent and Trademark Office is hereby authorized to charge any fee deficiency, or credit any overpayment, to our Deposit Account No. 19-0036.

Respectfully submitted,

STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.



Jeffrey T. Helvey  
Attorney for Patentees  
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JTH/LAG/mjg  
Enclosures

JAN 19 2005

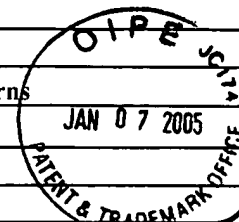
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Effective on 12/08/2004.

Fees pursuant to the Consolidated Appropriations Act, 2005 (H.R. 4818).

**FEE TRANSMITTAL**  
**For FY 2005**☐ Applicant claims small entity status. See 37 CFR 1.27**TOTAL AMOUNT OF PAYMENT** (\$) **100.00****Complete if Known**

Application Number	09/892,755
Filing Date	June 28, 2001
First Named Inventor	Lawrence M. Burns
Examiner Name	Benny T. Lee
Art Unit	2817
Attorney Docket No.	1875.0350001

**METHOD OF PAYMENT** (check all that apply)

☐ Check ☒ Credit Card ☐ Money Order ☐ None ☐ Other (please identify): \_\_\_\_\_

☒ Deposit Account Deposit Account Number: 19-0036 Deposit Account Name: Sterne, Kessler, Goldstein & Fox P.L.L.C.

For the above-identified deposit account, the Director is hereby authorized to: (check all that apply)

☐ Charge fee(s) indicated below ☐ Charge fee(s) indicated below, except for the filing fee

☒ Charge any additional fee(s) or underpayments of fee(s) under 37 CFR 1.16 and 1.17 ☒ Credit any overpayments

**WARNING:** Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.**FEE CALCULATION****1. BASIC FILING, SEARCH, AND EXAMINATION FEES**

Application Type	FILING FEES		SEARCH FEES		EXAMINATION FEES		Fees Paid (\$)
	Fee (\$)	Small Entity Fee (\$)	Fee (\$)	Small Entity Fee (\$)	Fee (\$)	Small Entity Fee (\$)	
Utility	300	150	500	250	200	100	
Design	200	100	100	50	130	65	
Plant	200	100	300	150	160	80	
Reissue	300	150	500	250	600	300	
Provisional	200	100	0	0	0	0	

**2. EXCESS CLAIM FEES**

Fee Description	Fee (\$)	Small Entity Fee (\$)
Each claim over 20 or, for Reissues, each claim over 20 and more than in the original patent	50	25
Each independent claim over 3 or, for Reissues, each independent claim more than in the original patent	200	100
Multiple dependent claims	360	180

**Total Claims** - 20 or HP = \_\_\_\_\_ x \_\_\_\_\_ = \_\_\_\_\_ **Fee (\$)** **Fee Paid (\$)**

HP = highest number of total claims paid for, if greater than 20

**Indep. Claims** - 3 or HP = \_\_\_\_\_ x \_\_\_\_\_ = \_\_\_\_\_ **Fee (\$)** **Fee Paid (\$)**

HP = highest number of independent claims paid for, if greater than 3

**3. APPLICATION SIZE FEE**

If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

**Total Sheets** - 100 = \_\_\_\_\_ **Extra Sheets** / 50 = \_\_\_\_\_ **Number of each additional 50 or fraction thereof** x \_\_\_\_\_ **Fee (\$)** **Fee Paid (\$)**

(round up to a whole number)

**4. OTHER FEE(S)**

Non-English Specification, \$130 fee (no small entity discount)

Other: Certificate of Correction**Fees Paid (\$)****\$100.00****SUBMITTED BY**

Signature	<u>Jeffrey T. Helvey</u>	Registration No. (Attorney/Agent)	44,757	Telephone	(202) 371-2600
Name (Print/Type)	Jeffrey T. Helvey	Date	1/7/2005		

This collection of information is required by 37 CFR 1.136. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

JAN 19 2005



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re patent of:

Burns *et al.*

Patent. No.: 6,819,199 B2

Issued: November 16, 2004

For: **Balun Transformer with Means for  
Reducing a Physical Dimension  
Thereof**

Confirmation No.: 3392

Art Unit: 2817

Examiner: Benny T. Lee

Atty. Docket: 1875.0350001

**Request for Certificate of Correction  
Under 37 C.F.R. § 1.322 and 1.323**

*Attn: Certificate of Correction Branch*

Commissioner for Patents  
PO Box 1450  
Alexandria, VA 22313-1450

Sir:

It is hereby requested that a Certificate of Correction under 37 C.F.R. §§ 1.322 and 1.323 be issued for the above-captioned United States Patent. This Certificate of Correction is being requested due to mistakes which appear in the printed patent. These mistakes were made by both the U.S. Patent and Trademark Office and by Applicants. The mistakes made by Applicants are of a clerical or typographical nature, or of a minor character. Patentee(s) submit that correction of these errors does not introduce new matter.

Specifically, the printed patent contains the following errors for which a Certificate of Correction is respectfully requested:

JAN 19 2005

***Applicant Errors:***

It is respectfully requested that the Applicant's mistake be corrected in the following way:

- In column 14 line 11, "λ4" should be replaced with --λ/4--.

***U.S. Patent and Trademark Office Errors:***

In addition, it is requested that mistakes made by the U.S. Patent and Trademark Office be corrected in the following way:

- In column 12 lines 7, 11, 14, 17, 20, and 24, the phrase "claim 1" should be replaced with --claim 2--; and
- In column 12 line 23, the phrase "at to said input" should be replaced with --at said input--.

Support for the first correction can be found in the response to the Office Action sent on April 30, 2004, which is included as Exhibit A. Support for the second correction can be found in the Examiner's Amendment received on July 12, 2004, which is included as Exhibit B.

***Remarks***

The above-noted corrections do not involve such changes in the patent as would constitute new matter or would require reexamination.

A completed Form PTO/SB/44 accompanies this request, with the above-noted corrections printed thereon. Accordingly, a Certificate of Correction is believed proper and issuance thereof is respectfully requested.

This request is accompanied by payment of the fee set forth in 37 C.F.R.  
§ 1.20(a). The Commissioner is hereby authorized to charge any fee deficiency, or credit  
any overpayment, to our Deposit Account No. 19-0036.

Respectfully submitted,

STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.



Jeffrey T. Helvey  
Attorney for Patentees  
Registration No. 44,757

Date: 1/7/2005

1100 New York Avenue, N.W.  
Washington, D.C. 20005-3934  
(202) 371-2600

JAN 19 2005

## UNITED STATES PATENT AND TRADEMARK OFFICE CERTIFICATE OF CORRECTION

PATENT NO: 6,819,199 B2

DATED: Nov. 16, 2004

INVENTORS: Burns *et al.*

It is certified that an error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below.

### Column 12

In lines 7, 11, 14, 17, 20, and 24, the phrase "claim 1" should be replaced with --claim 2--; and

In line 23, the phrase "at to said input" should be replaced with --at said input--.

### Column 14

In line 11, " $\lambda$ 4" should be replaced with -- $\lambda/4$ --.

MAILING ADDRESS OF SENDER:

PATENT NO. 6,819,199 B2

Sterne, Kessler, Goldstein & Fox P.L.L.C.  
1100 New York Avenue, N.W.  
Washington, DC 20005-3934

No. of additional copies

 1

This collection of information is required by 37 CFR 1.322, 1.323 and 1.324. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1.0 hour to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you are required to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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Rev. 10/03/03 svb

JAN 19 2005



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

Burns *et al.*

Appl. No.: 09/892,755

Filed: June 28, 2001

For: **Balun Transformer for a Satellite  
Television Tuner**

Confirmation No.: 3392

Art Unit: 2817

Examiner: Benny T. Lee

Atty. Docket: 1875.0350001

**Amendment and Reply Under 37 C.F.R. § 1.111**

Commissioner for Patents  
PO Box 1450  
Alexandria, VA 22313-1450

Sir:

In reply to the Office Action dated January 30, 2004, Applicants submit the following Amendment and Remarks. This Amendment is provided in the following format:

- (A) Each section begins on a separate sheet;
- (B) Starting on a separate sheet, amendments to the specification by presenting replacement paragraphs marked up to show changes made;
- (C) Starting on a separate sheet, a complete listing of all of the claims:
  - in ascending order;
  - with status identifiers; and
  - with markings in the currently amended claims;
- (D) Starting on a separate sheet, the Remarks.

It is not believed that extensions of time or fees for net addition of claims are required beyond those that may otherwise be provided for in documents accompanying this paper. However, if additional extensions of time are necessary to prevent abandonment of this application, then such extensions of time are hereby petitioned



under 37 C.F.R. § 1.136(a), and any fees required therefor (including fees for net addition of claims) are hereby authorized to be charged to our Deposit Account No. 19-0036.

### *Amendments to the Specification*

Please replace the following paragraphs:

[0039] One suitable structure is the Marchand balun 100, shown in FIG. 1B. This classic balun implementation uses two quarter-wavelength ( $\lambda/4$ ) sections of coaxial cable inside another coaxial shield. One section includes electromagnetically coupled lines 104 and 108, and the other section includes electromagnetically coupled lines 102 and 106. The electromagnetic coupling between coaxial line 102 and 106 and between 104 and 108 results in a signal at balun output 112 that is equal in amplitude and opposite in phase to a signal at balun output 114 relative to an input signal at balun input 110. FIG. 1B includes an exemplary impedance value of  $75\Omega$  at outputs 112 and 114.

[0040] A coaxial cable can be flattened and adapted into printable form by cross sectioning the coaxial structure and flattening the conductors into coplanar waveguides. Referring to FIG. 2A, a coplanar waveguide 202 comprises a signal trace 206 flanked on both sides by a ground 208. Signal trace 206 and ground 208 are laid on a substrate 212. Referring to FIG. 2B, a coplanar waveguide with ground 204 comprises the elements of waveguide 202 and an additional ground 209 under metal trace 206. In coplanar waveguide 204, ground 208 can be connected with ground 209 by vias 220 through substrate 212. In FIGs. 2A and 2B, the reference labels "s" and "w" represent conductor spacing width; the reference label "h" represents dielectric height of the substrate 212; and the reference label " $\epsilon_r$ " represents the dielectric constant of the substrate 212. Balun 100 is modified for printed circuit board use by transforming coaxial cable into the coplanar waveguide 202 as illustrated in FIG. 3. Vias 220, also known as plated through

holes, provide electrical connection between different layers in multi layer printed circuit boards.

[0059] Referring to FIG. 5B, an embodiment of a balun ~~501~~ 500 is presented as balun 550 with calculated element values and metal trace dimensions. Balun 550 shows common reference numbers with the balun 500 that were already discussed with reference to FIG. 5A. Balun 501 has the following electrical characteristics:

Impedance:  $75\Omega$  unbalanced in/balanced out

Bandwidth: 950-215- MHZ

Insertion loss: <0.7 dB

Input return loss: >10 db with BCM3440 Satellite Tuner LNA at output

[0066] FIG. 8 illustrates an apparatus 800 for transferring direct current power and low frequency digital control signals to low noise block 120 (see Fig. 1A) adapted for use with balun 500 (see Fig. 5A). The embodiment of FIG. 8 is presented with exemplary dimension values for the balun 800 including widths equal to 7 mils, 21 mils, 28 mils, 35 mils, and 63 mils and spacing between elements equal to 21 mils, 75 mils and 425 mils. Direct current power is defined as power supplied from a current source as direct current or from a voltage source as direct voltage. In addition to direct current power, low frequency digital control signals can be supplied to low noise block 120. A direct current power and low frequency digital control signal source 802 is coupled to spiral inductor 810. Direct current power and low frequency digital control signals can be supplied from source 802 together or either signal separately. Spiral inductor 810 is connected to balun radio frequency input 702, approximately 425 mils from balun input

110. Radio frequency input 702 is connected to coaxial cable 132 (see Fig. 1A). Coaxial cable 132 is connected to low noise block 120. A capacitor 804 is also coupled to ground 512 and to radio frequency input 702 approximately 425 mils from balun input 110. Capacitor 804 and inherent capacitance from the connection of spiral inductor 810 reduce undesirable cross over interference at balun input 110. Ground 512 is provided from vias 220. Individual vias are shown as solid dots but, for clarity, each is not labeled.

[0070] FIG. 10 illustrates balun 1000 which is an embodiment of the present invention. The embodiment of FIG. 10 is presented with exemplary dimension values for the balun 1000 including widths equal to 0.007", 0.011", 0.016", 0.020", 0.030", 0.050", 0.480", and 0.525", spacing between elements equal to 0.020" and 0.250", and diameters equal to 0.010". Balun 1000 has balun input 110 coupled to input capacitor 912. Capacitor 912 is connected to inductor 910. An input transmission line 1006 is coupled to inductor 910 and to loading capacitor 922. Capacitor 922 is coupled between transmission line 1006 and ground 512. Transmission lines 1002, 1004, and 1010 are electrically coupled to output capacitor 914 and output capacitor 916. Output inductor 930 is connected to balun negative output 920. Output inductor 928 is connected to output capacitor 914 and balun positive output 918. Tuning capacitor 926 is connected between the output side of capacitors 914 and 916. Transmission line 1006 is electromagnetically coupled to transmission lines 1002, 1004, and 1010 that results in a signal at output 918, in response to a signal applied to balun input 110, that is equal in amplitude and opposite in phase to a signal at output 920.

[0071] Ground 512 is provided from vias 220. Individual vias are shown as solid dots but, for clarity, each is not labeled. Also for clarity, diagonal lines are not used to show the location of ground 512. Elements containing vias 220 are coupled to ground 512. In the embodiment shown in FIG. 10 ground 512 is located on layer two under everything except balun. There is also a ground on layer four located beneath everything.

[0072] FIG. 10 also illustrates an embodiment of a device used to provide direct current and voltage power or low frequency digital control signals to low noise block 120 (see Fig. 1A). Direct current power and low frequency digital control signal source 802 is coupled to meandered trace 1025. Trace 1025 is coupled to balun 1000 between input 110 and input capacitor 912. Meandered trace 1025 provides a high impedance to data signal\_122 to minimize undesired electrical loading of balun 1000 and low noise block 120.

[0073] FIG. 11 illustrates an alternate embodiment of a spiral inductor used to transfer direct current power and low frequency digital control signals to coaxial cable 132 (see Fig. 1A). The embodiment of FIG. 11 is presented with exemplary dimension values for the balun 1100 including widths equal to 0.007", 0.021", 0.030", 0.060", and 0.238" and a diameter equal to 0.010". Spiral inductor 1100 has direct current power and low frequency digital control signal source 802. A connection 1120 couples spiral 1100 to balun input 110. Ground 512 is provided from vias 220. Individual vias are shown as solid dots but, for clarity, each is not labeled. Ground 512 is also located under the spiral elements. For clarity the ground under spiral inductor 1100 is not illustrated with diagonal lines. The top layer ground 512 is shown with diagonal lines.

***Amendments to the Claims***

1. (previously presented) A balun, comprising:

- a first capacitor coupled to an input;
- a plurality of first coupled metal traces coupled to said first capacitor;
- a plurality of second coupled metal traces, said plurality of second coupled metal traces electromagnetically coupled to said plurality of first coupled metal traces;
- a ground coupled to said plurality of second coupled metal traces;
- a first output coupled to said plurality of second coupled metal traces;
- a second output coupled to said plurality of second coupled metal traces,
- a second capacitor coupled between said plurality of first coupled metal traces and ground, wherein said second capacitor electrically loads said plurality of first coupled metal traces so that each metal trace in said plurality of first coupled metal traces and said plurality of second coupled metal traces has a physical length less than one-quarter wavelength of an input signal received at said input;
- a third capacitor coupled to said first output; and
- a fourth capacitor coupled to said second output.

2. (currently amended) The balun of claim 1, wherein said plurality of first coupled metal traces and said plurality of second coupled metal traces are located on a surface layer of a printed circuit board.

3. (currently amended) The balun of claim 1, wherein said plurality of first coupled metal traces and said plurality of second coupled metal traces are located on the same layer of a printed circuit board.

4. (currently amended) The balun of claim 1, wherein said ground is placed beneath said plurality of first coupled metal traces and said plurality of second coupled metal traces.

5. (currently amended) The balun of claim 1, wherein said ground is placed at a periphery of said plurality of first coupled metal traces and said plurality of second coupled metal traces.

6. (original) The balun of claim 1, further comprising:

a fifth capacitor coupled between said first output and said second output.

7. (previously presented) The balun of claim 1, wherein said first output provides a signal having an equal amplitude and opposite phase to a signal provided from said second output in response to a signal received at ~~input to~~ said input.

8. (previously presented) The balun of claim 1, wherein said plurality of first coupled metal traces and said plurality of second coupled metal traces comprise respective ~~are~~ transmission lines.

9. (original) The balun of claim 8, wherein said plurality of first coupled transmission lines comprises one first coupled transmission line or two first coupled transmission lines.

10. (canceled)

11. (original) The balun of claim 8, wherein said transmission lines are coplanar waveguide transmission lines or microstrip transmission lines.

12. (original) The balun of claim 1, further comprising a first impedance matching network coupled to said input and a second impedance matching network coupled to said first output and said second output.

13. (original) The balun of claim 12, wherein said first impedance matching network comprises a fifth capacitor series coupled to an inductor.

14. (original) The balun of claim 12, wherein said second impedance matching network comprises:

two coupled metal traces, wherein at least one of a metal trace width, a metal trace spacing and a metal trace thickness is adjusted to provide a desired output impedance.

15. (original) The balun of claim 14, wherein said second impedance matching network comprises lumped element components.



16. (original) The balun of claim 12, wherein an input impedance of said balun is approximately 50 to 75 ohms.

17. (original) The balun of claim 12, wherein ~~the~~<sup>an</sup> output impedance of said balun is a desired value.

18. (original) The balun of claim 1, wherein a direct current power and low frequency digital control signal source is coupled to said input.

19. (original) The balun of claim 18, wherein a metal trace is coupled between said direct current power and low frequency digital control signal source and said input, wherein said metal trace does not effect said balun's electrical characteristics over a desired frequency range.

20. (original) The balun of claim 19, wherein said metal trace is a spiral inductor.

21. (original) The balun of claim 20, wherein said inductor is coupled to said input approximately 425 mils from said input.

22. (currently amended) A balun comprising:

a plurality of coupled metal traces;

an input, coupled to ~~said~~<sup>an</sup> corresponding ones of said plurality of coupled metal traces;

an output, coupled to said corresponding ones of said plurality of coupled metal traces;

means for producing output signals having an equal amplitude and opposite phase responsive to an input signal received at said input, and

means for reducing a physical dimension of said metal traces.

23 - 35. (canceled)

36. (previously presented) A balun, comprising:

a plurality of first coupled metal traces that are electrically coupled to each other;

a plurality of second coupled metal traces that are electrically coupled to each other and to said plurality of first coupled metal traces, one end of said plurality of second coupled metal traces connected to ground;

a single-ended input coupled to said plurality of first coupled metal traces, and a differential output taken from said plurality of second coupled metal traces;

at least one of said plurality of first coupled metal traces capacitively coupled to ground, thereby electrically lengthening said plurality of first coupled metal traces and said plurality of second coupled metal traces.

37. (previously presented) The balun of claim 36, wherein said single-ended input is capacitively coupled to said plurality of first coupled metal traces.

38. (previously presented) The balun of claim 36, wherein said differential output is capacitively coupled to said plurality of second coupled metal traces.

39.(previously presented) The balun of claim 36, wherein a physical length of said plurality of first coupled metal traces and said plurality of second coupled metal traces is less than  $\lambda/4$  of an input signal received by said input.

***Remarks***

Upon entry of the foregoing amendment, claims 1-9, 11-22, and 36-39 are pending in the application, with claims 1 and 36 being the independent claims. Claims 10 and 23-35 are sought to be cancelled without prejudice to or disclaimer of the subject matter therein. Claims 2-5 and 22 have been amended to correct informalities. These changes are believed to introduce no new matter, and their entry is respectfully requested. Based on the above amendment and the following remarks, Applicants respectfully request that the Examiner reconsider all outstanding objections and rejections and that they be withdrawn.

***Objection to the Claims***

In the Office Action, the Examiner objected to claims 2-5 and 22 due to matters of form. Applicants have amended claims 2-5 and 22 to improve their form as suggested by the Examiner.

***Objection to the Specification***

In the Office Action on page 2, the Examiner objected to the specification because of various informalities. Specifically, the Examiner objected to replacement paragraph [0066] because "it is unclear whether the reference to '425 mils ...' is appropriate since the description of this paragraph pertains to 'Fig. 8' while '425 mils' limitation appears to relate to the 'fig. 7' description." Applicants submit that Fig. 8 on formal drawing sheet 13 contains typographical errors in the label "432 mils TO BALUN

INDICATOR." In Fig. 8, as originally filed, this label correctly stated "425 mils to BALUN INDUCTOR." Applicants have amended Fig. 8 on drawing sheet 13 to reflect the label used in originally filed Fig. 8. Applicants submit that this amendment addresses the informalities raised by the Examiner.

Applicants have amended replacement paragraph [0072] to include a separation between "signal 122" as suggested by the Examiner.

On page 2 of the Office Action, the Examiner objected to the specification because of informalities related to reference labels in the Figures. Applicants have amended paragraph [0039] to refer to the reference value in FIG. 1B. Paragraph [0039] now recites " FIG. 1B includes an exemplary impedance value of  $75\Omega$  at outputs 112 and 114." Applicants have amended paragraph [0040] to refer to the reference labels in FIGs. 2A and 2B. Paragraph [0040] now recites "In FIGs. 2A and 2B, the reference labels "s" and "w" represent conductor spacing width; the reference label "h" represents dielectric height; and the reference label " $\epsilon_r$ " represents dielectric constant.

The Examiner objected to Fig. 5B stating that "all reference labels except '512'" need explicit description in the specification. Applicants have amended paragraph [0059] to correct the reference number associated with the balun. Paragraph [0059] now recites "Referring to FIG. 5B, an embodiment of balun 500 is presented as balun 550 ... Balun 550 shows common reference numbers with the balun 500 that was discussed with reference to FIG. 5A." Applicants submit that this amendment clarifies the use of the reference numbers in Fig. 5B.

Applicants have amended Fig. 7 to replace the label "(.425)" with the label "425 mils" to provide consistency with the specification.

The Examiner further objected to the dimension labels used in Figs. 8, 10, and 11. Applicants have amended paragraph [0066] to recite "[t]he embodiment of FIG. 8 is presented with exemplary dimension values for the balun 800 including widths equal to 7 mils, 21 mils, 28 mils, 35 mils, and 63 mils and spacing between elements equal to 21 mils, 75 mils and 425 mils". Applicants have amended paragraph [0070] to recite "[t]he embodiment of FIG. 10 is presented with exemplary dimension values for the balun 1000 including widths equal to 0.007", 0.011", 0.016", 0.020", 0.030", 0.050", 0.480", and 0.525", spacing between elements equal to 0.020" and 0.250", and diameters equal to 0.010". Applicants have amended paragraph [0073] to recite "[t]he embodiment of FIG. 11 is presented with exemplary dimension values for the balun 1100 including widths equal to 0.007", 0.021", 0.030", 0.060", and 0.238" and a diameter equal to 0.010." Applicants submit that these amendments provide sufficient description of the dimension labels used in Figs. 8, 10, and 11. Furthermore, the dimensions are clearly repeated in the mentioned Figures.

Based on the amendments and discussion above, Applicants request that the specification objections be removed.

### ***Objections to the Drawings***

On page 2 the Examiner objected to Fig. 8 because the label "'BALUN INDICATOR' should correctly be -- BALUN INDUCTOR--." As discussed above, Applicants have amended Fig. 8 as suggested by the Examiner.

The Examiner also objected to Fig. 10 because "reference label '512' still needs to be provided as per the description of fig. 10 at paragraph [0071]." Applicants note that

paragraph [0071] describes the location of ground as "[i]n the embodiment shown in FIG. 10 ground 512 is located on layer two under everything except balun. There is also a ground on layer four located beneath everything." Therefore, 512 will not appear in the top-down view of Balun 1000. Because paragraph [0071] sufficiently describes the location of the ground, Applicants have deleted reference number 512 from paragraph [0071]. Accordingly, Applicants request that the drawing rejection be removed.

***Rejections under 35 U.S.C. § 102***

Claim 22 was rejected under 35 U.S.C. §102(b) as being anticipated by Tang, U.S. Patent No. 6,483,415 (Tang). Applicants respectfully submit that Tang is not available as prior art.

The present application properly claims benefit under 35 U.S.C. §119(e) to provisional application 60/262,629, filed January 22, 2001. (See Application Data Sheet; Specification, pg. 1). Therefore, because at least claim 22 is fully supported under 35 U.S.C. §112 by the provisional application, the effective filing date to be used for at least claim 22 is the filing date of the provisional application, January 22, 2001. The filing date of Tang is May 21, 2001. Because Tang was filed after the effective filing date of at least claim 22, Applicants submit that Tang is not available as prior art. Applicants therefore respectfully request that the Examiner reconsider and withdraw this ground of rejection.

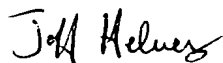
***Conclusion***

All of the stated grounds of objection and rejection have been properly traversed, accommodated, or rendered moot. Applicants therefore respectfully request that the Examiner reconsider all presently outstanding objections and rejections and that they be withdrawn. Applicants believe that a full and complete reply has been made to the outstanding Office Action and, as such, the present application is in condition for allowance. If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided.

Prompt and favorable consideration of this Amendment and Reply is respectfully requested.

Respectfully submitted,

STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.



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Attorney for Applicants  
Registration No. 44,757

Date: 4/30/04

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13/21

800

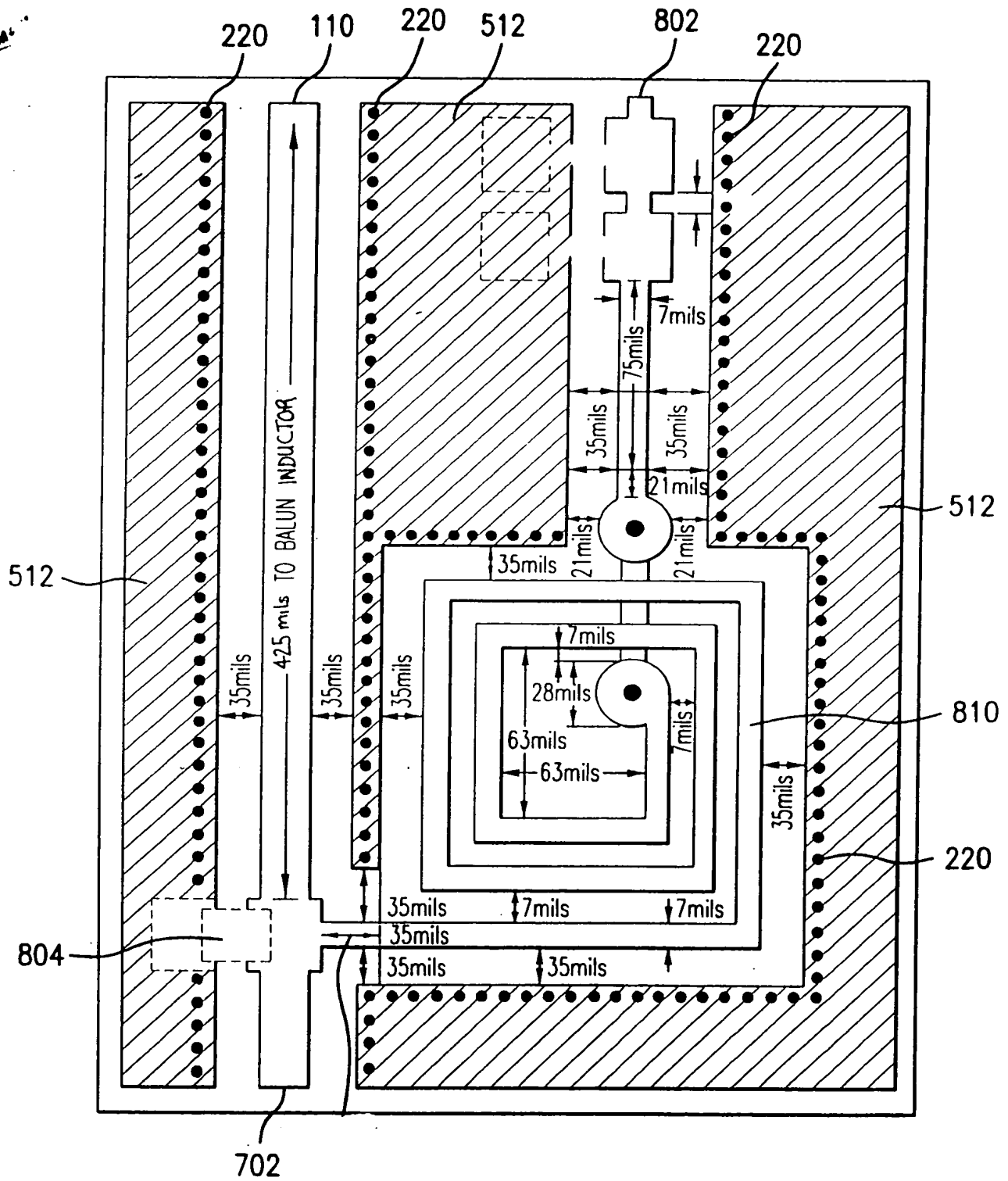


FIG. 8



REPLACEMENT SHEET



12/21

700

500

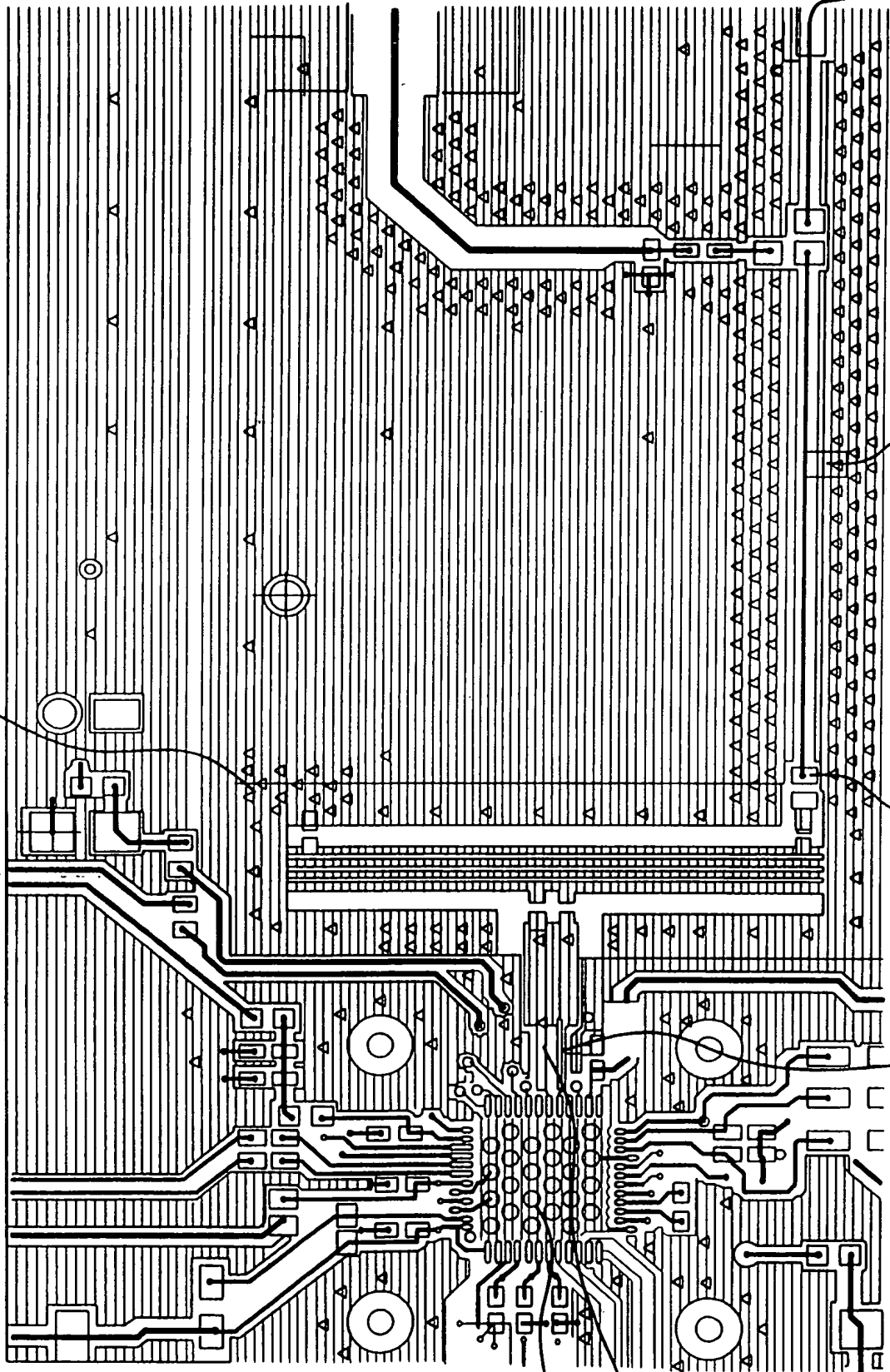


FIG. 7

706

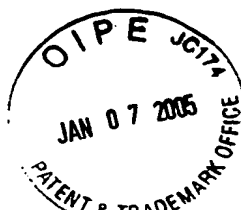
4.25mils

110

112

704

114



**EXAMINER'S AMENDMENT**

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Jeff Helvey on 30 June 2004.

The application has been amended as follows:

**In the Claims:**

In claim 7, line 3, "input to" has been deleted.

In claim 8, line 3, "are" has been deleted.

In claim 17, line 1, "the" has been deleted and replaced by --an--.

In claim 22, line 3, "said" has been deleted.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Benny Lee whose telephone number is 571 272 1764.

B. Lee

BENNY T. LEE  
PRIMARY EXAMINER  
ART UNIT 2817